ICP/EXT-05-00865
Revision 0

Closure Plan for the Coal-Fired Steam Generating Facility Ash Bury Pit at the Idaho National Laboratory

June 2005

Idaho Cleanup Project

The Idaho Cleanup Project is operated for the
U.S. Department of Energy by CH2M◆WG Idaho, LLC

ICP/EXT-05-00865
Revision 0
Project No. 25027

Closure Plan for the Coal-Fired Steam Generating Facility Ash Bury Pit at the Idaho National Laboratory

June 2005

Idaho Cleanup Project

Idaho Falls, Idaho 83415

Prepared for the
U.S. Department of Energy
Assistant Secretary for Environmental Management
Under DOE-NE Idaho Operations Office
Contract DE-AC07-05ID14516

ABSTRACT

This Solid Waste Management Rules Closure Plan addresses the ash bury pit at the Coal-Fired Steam Generating Facility at the Idaho National Laboratory. The landfill area to be closed includes a 7-acre area surrounded by a berm with established vegetation. The ash pit landfill will be closed in accordance with the requirements of the Idaho Administrative Procedures Act (IDAPA) Solid Waste Management Rules in IDAPA 58.01.06. This Closure Plan presents the approach to be utilized to ensure that the clean site/access control and drainage/erosion control standards required to be protective of human health and the environment are achieved in accordance with the requirements of IDAPA 58.01.06.

CONTENTS

ABSTRACT iii

ACRONYMS vii

1. PURPOSE AND SCOPE 1

2. CFSGF ASH BURY PIT OPERATING HISTORY 1

3. CLOSURE APPROACH 2

3.1 Closure Requirements 2

3.1.1 Grading 2
3.1.2 Seeding 3
3.1.3 Site Closure 3

3.2 Closure Plan Application 3

3.2.1 Complete and Accurate Legal Description of the Facility 3
3.2.2 Map of the Facility 3
3.2.3 Estimated Date of Last Receipt of Waste 3
3.2.4 Description of How Public Access to the Closed Facility Will Be Controlled 3
3.2.5 Estimated Waste In-Place 4
3.2.6 Total Acreage of the Facility and Acres Containing Waste 4
3.2.7 Closure Equipment and Procedures To Be Used 4
3.2.8 Texture, Depth, and Permeability of Final Cover Material 4
3.2.9 Design and Construction Plan for Any Necessary Final Cover 4
3.2.10 Placement, Design, and Management of Run-On and Run-Off Storm Water Controls 5
3.2.11 Types of Vegetation and Planting Procedures To Be Used for Establishing Vegetative Cover 5

4. REFERENCES 5

ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFSGF	Coal-Fired Steam Generating Facility
DOE Idaho	Department of Energy Idaho Operations Office
IDAPA	Idaho Administrative Procedures Act
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
OU	operable unit
ROD	Record of Decision
WAG	waste area group

Closure Plan for the Coal-Fired Steam Generating Facility Ash Bury Pit at the Idaho National Laboratory

1. PURPOSE AND SCOPE

This Closure Plan is submitted for the U.S. Department of Energy Idaho Operations Office (DOE Idaho) Idaho National Laboratory (INL) Coal-Fired Steam Generating Facility (CFSGF) ash bury pit as required by the Idaho Administrative Procedures Act (IDAPA) Solid Waste Management Rules in IDAPA 58.01.06. This Closure Plan presents the approach to ensure that the clean site/access control and drainage/erosion control standards required to protect human health and the environment are achieved in accordance with the requirements of IDAPA 58.01.06. Specifically, the ash bury pit will be closed in compliance with IDAPA 58.01.06.001.04.d, "Facilities which cease accepting solid waste prior to April 26, 2002 shall be required to only comply with applicable cover, seeding, grading and closure requirements of the former Solid Waste Management Rules and Standards..."

2. CFSGF ASH BURY PIT OPERATING HISTORY

The CFSGF, CPP-687, was constructed in 1983 and started operating in 1984; operations were discontinued in 1999. The facility was designed to provide steam for current and future projects at the Idaho Nuclear Technology and Engineering Center (INTEC). In 1984, the CFSGF started generating approximately 1,000 tons of ash per year. The ash was disposed of at the ash bury pit landfill. The capacity of the original ash bury pit was 70,000 yd^3. In 1991, the pit was enlarged to a 120,000-yd^3 capacity (approximately 800 × 400 × 11 ft). The pit is located approximately 300 ft from the CFSGF fence on the southeast side of the East Perimeter Road (see SPC-674, Sheet C-2). The ash bury pit disposal operations ceased in October 1999.

Limestone was added to the coal prior to burning to reduce subsequent emissions of sulfur oxides and to control bed depth in a process called atmospheric fluidized bed combustion. The process residue (ash), consisting of fly ash, bottom ash, calcium carbonate, and calcium sulfate, was mixed with water prior to disposal at the ash bury pit landfill where the slurry then dried.

Rigorous characterization efforts have been performed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The Waste Area Group 3 (WAG 3) environmental risk assessment determined "the site is of potential risk to ecological receptors from metals contamination" (INEEL 2000). Analyses results from 1985-1989 indicated the majority of the analyzed hazardous substances were at concentrations below INL surface soil background concentrations. Based on this determination, the site (CPP-66) was passed on to WAG 10 for further investigation. The Operable Unit 3-13 (OU 3-13) Final Record of Decision (ROD) (DOE-ID 1999) states that the ash bury pit "presents only a potential ecological risk and will be addressed under CERCLA OU 10-04." The OU 10-04 effort focused on INL-wide ecological risk concerns. The field sampling activities indicate that this site does not pose risks to ecological receptors. Therefore, this site is recommended for no further action (DOE-ID 2001). The conclusion in Appendix J of DOE-ID (2001) states all inorganic results were either below detectable limits or within typical INL soil background concentrations. However, because the ROD did not state or identify applicable or relevant and appropriate requirements to close the ash bury pit, the closure defaults to the State of Idaho closure requirements.

3. CLOSURE APPROACH

This section describes the approach planned to ensure compliance with the closure requirements specified in IDAPA 58.01.06.001.04.d. The sloping and permeability designs, however, are consistent with the more recent requirements identified in IDAPA 58.01.06.012.11.f. In addition, a closure plan application has been provided in compliance with IDAPA 58.01.06.012.06.

3.1 Closure Requirements

The closure requirements identified in IDAPA 58.01.06.001.04.d.i., ii., and iii. address the following:

i. Grading

ii. Seeding

iii. Site Closure.

3.1.1 Grading

IDAPA 58.01.06.001.04.d.i. reads as follows: *The entire site, including the landfill surfaces, shall be graded and provided with drainage facilities to minimize runoff onto and into the sanitary landfill to prevent erosion or washing and to prevent the collection of standing water. The grading of the final surface of the fill area must provide a slope of not less than one percent (1%), but not exceeding fifteen percent (15%), except as approved by the Department or as required in Section 39-7415(3), Idaho Code.*

Following assessment of the site, it was identified that the closure of this landfill would use the design for final cover and slope stability identified in IDAPA 58.01.06.012.11.f. This standard provides sloping requirements, a final soil cover for vegetation that minimizes erosion and sustains plant growth, and a layer to minimize infiltration. This standard was selected since it provides a design that is robust in terms of the final soil cover for vegetation that minimizes erosion and sustains plant growth, establishes sloping requirements that best fit this particular site, and provides a layer to reduce potential infiltration. The following describes the grading and cover design that is planned to be provided.

The 7-acre area is surrounded by a berm that will serve to control the run-on and run-off from a 25-year, 24-hour storm event. The berm and surface contours will direct 75% of the surface waters to a storm water drainage depression located east of the pit. The remaining 25% of the surface waters will flow off the final cap towards the west and will be incorporated into existing drainage features. To help minimize erosion of the cap, the existing vegetated sideslopes of the pit will not be disturbed. In addition, the final 10-in. soil lift will consist of a mixture of low-permeability soil and pea-gravel. The gravel-to-soil mixture by weight is 25% and will be placed on the cover in one minimally compacted lift. The gravel will primarily assist in minimizing surface erosion to run-off. The gravel and soil mixture will encourage evapotranspiration, allow for vegetation growth, and reduce surface erosion.

The depression, located on east end of the pit that was created when the pit was enlarged in 1991 (see Section 2), received some slurry. The layer of slurry will be removed and disposed of to the main part of the ash bury pit or ash pile prior to placing the final cap.

3.1.2 Seeding

IDAPA 58.01.06.001.04.d.ii. reads as follows: *Seeding to promote stabilization of the final soil cover shall be done as soon as weather permits seed bed preparation and planting operations and when seasonal conditions are suitable for the type of vegetation to be used. Re-seeding is mandatory until adequate vegetative cover is established to prevent erosion.*

Native grasses or their functional equivalents will be used in the revegetation effort associated with the final cover and other disturbed areas of the ash bury pit. Revegetation efforts will be accomplished using disks, harrows, or other similar equipment as well as hand tools and hand-crank seeders, as needed. A commercial seed mix comprised of native grasses will be used for reestablishment of the perennial plant community. Seeding activities will focus on maintaining the health and viability of this plant community.

3.1.3 Site Closure

IDAPA 58.01.06.001.04.d.iii. reads as follows: *An inspection of the entire site of the completed sanitary landfill, or other solid waste management site that is to be vacated, shall be made by a representative of the District before earth moving equipment or other equipment vital to disposal of solid waste is removed from the site or used on other projects. Any necessary corrective work shall be performed before the operation is accepted as completed.*

There will be no solid waste requiring removal. Representatives from the Southeastern District Health Department and the Department of Environmental Quality toured the ash bury pit on February 25, 2005. Arrangements will be made for their return for an inspection upon completion of the closure activities.

3.2 Closure Plan Application

The following information is provided to support the applicable Closure Plan Application criteria.

3.2.1 Complete and Accurate Legal Description of the Facility

The ash bury pit is located within Township 3 North, Range 30 East, Section 19. The pit is located at the INTEC facility.

3.2.2 Map of the Facility

The final design package (SPC-674) includes the construction drawings of the proposed ash bury pit landfill closure. The design shows the following pertinent facility features: facility boundaries, ground contours (drainage patterns), location of fill areas, and location of access. There are no ponds, lakes, reservoirs, canals, irrigation systems, or existing water supplies within 1/4 mile of the facility boundary. The proposed final contours of the facility are shown on Sheet C-2 in the final design package.

3.2.3 Estimated Date of Last Receipt of Waste

The estimated date of last receipt of ash is October 1999.

3.2.4 Description of How Public Access to the Closed Facility Will Be Controlled

The INL facilities are located within controlled access entrance points using manned entrance gates and security fencing. The ash bury pit landfill is located outside of the INTEC facility security fence, but

within the INL-controlled access boundary. The controlled access and patrol actions prevent public access to the closed facility.

3.2.5 Estimated Waste In-Place

The estimated total volume of waste-in-place is 73,000 yd^3.

3.2.6 Total Acreage of the Facility and Acres Containing Waste

The total acreage of the CFSGF is approximately 15 acres. The total acreage of the ash bury pit landfill is 7 acres (approximately 800 × 400 × 11 ft), which is located outside of the 15-acre fenced area.

3.2.7 Closure Equipment and Procedures To Be Used

Eighteen inches of compacted soil at a hydraulic conductivity goal of 1×10^{-5} cm/sec or less will be placed for the final cover. This material will be placed at a maximum thickness of 6 in. per compacted lift and compacted at ±2% of optimum moisture content to a minimum density of 95% of standard proctor. The low-hydraulic-conductivity compacted final cover shall be placed using standard grading equipment such as scrapers, loaders, or graders. A tamp foot or sheeps foot compactor shall be used to tie lifts together and to achieve proper compaction. Graders shall be used to smooth out contours and achieve the final design grade.

3.2.8 Texture, Depth, and Permeability of Final Cover Material

The low-hydraulic-conductivity layer of the final cover will consist of fine-grained native soils obtained from one of several borrow areas located at the INL. Currently, the Rye Grass Flats borrow area would be the best source of soils. Rye Grass Flats is located 5.5 miles east of the Central Facilities Area. On the average, this material is described as lean clay with sand, containing approximately 55% clay and 20-30% silt and fine-grained sand. The soil has a liquid limit of 30 and plastic limit of 17 with optimum moisture content of 16% at a maximum dry density of 112 pcf per the Standard Proctor Method (ASTM D698). Final cover material will be placed at a maximum thickness of 6 in. per compacted lift and compacted at ±2% optimum moisture content to achieve a minimum of 95% of standard proctor density. The 18-in. compacted soil final cover will have a hydraulic conductivity goal of 1×10^{-5} cm/sec or less.

Two other soil layers are necessary for the function of the final cover. The bottommost layer will consist of a combination of excavated material (from the basin area of the pit) and pit run gravel of varying depth used to establish the grade for constructing the minimum slope requirement. SPC-674 (final design package) shows cross sections and finished contours of the ash bury pit cover. This material is readily available in stockpiles close to the ash pit site. The last layer will consist of 10 in. of fine-grained soil from Rye Grass Flats mixed with pea-gravel (to minimize erosion) placed over the low-hydraulic-conductivity soil layer. This soil layer will be used for establishing vegetative cover, encouraging evapotranspiration, and reducing surface erosion.

3.2.9 Design and Construction Plan for Any Necessary Final Cover

As described above, the final cover will consist of three layers. The bottommost layer will consist of a combination o f excavated material (from the basin area of the pit) and pit run gravel of varying depth used to establish the grade for constructing the minimum slope requirement. The final cover layer will consist of an 18-in. layer of compacted soil with an in-place hydraulic conductivity goal of less than 1×10^{-5} cm/sec. This field hydraulic conductivity value is designed to minimize infiltration

through the landfill area. The top 10-in. soil layer that will minimize erosion and sustain plant growth will be constructed over the low-permeability soil layer. The final cover will be graded to prevent surface water ponding and erosion and will conform to the existing pit berms. The finished grade will include a minimum of 2% slope across the top of the cover after settlement. Side slopes outside the waste-containing boundary will be sloped at a maximum of 3 horizontal to 1 vertical. SPC-674 (final design package) shows cross sections and finished contours of the ash bury pit cover.

3.2.10 Placement, Design, and Management of Run-On and Run-Off Storm Water Controls

The pit is surrounded by a berm that will continue to control surface water. The pit is sloped to direct surface water to a depression located east of the ash bury pit. This depression will serve as the storm water drainage basin. Routine inspections of the run-on and run-off storm water controls will be performed during construction of the final cover to ensure that berm, diversions, and storm water controls are free of debris and in good repair.

3.2.11 Types of Vegetation and Planting Procedures To Be Used for Establishing Vegetative Cover

Native grasses or their functional equivalents will be used in the revegetation effort associated with the final cover and other disturbed areas of the ash bury pit. Revegetation efforts will be accomplished using disks, harrows, or other similar equipment as well as hand tools and hand-crank seeders, as needed. A commercial seed mix comprised of native grasses will be used for reestablishment of the perennial plant community. Seeding activities will focus on maintaining the health and viability of this plant community and will ensure that invasion by noxious weeds and other invasive plants (e.g., invasive annual species and crested wheatgrass stands) will not occur.

4. REFERENCES

ASTM D698, 2000, "Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort," American Society for Testing and Materials, June 10, 2000.

DOE-ID, 1999, *Final Record of Decision, Idaho Nuclear Technology and Engineering Center, Operable Unit 3-13, Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho*, DOE/ID-10660, Rev. 0, U.S. Department of Energy Idaho Operations Office, October 1999.

DOE-ID, 2001, *Comprehensive Remedial Investigation/Feasibility Study for Waste Area Groups 6 and 10 Operable Unit 10-04*, DOE/ID-10807, Rev. 0, U.S. Department of Energy Idaho Operations Office, August 2001.

IDAPA 58.01.06, 2003, "Solid Waste Management Rules," Idaho Department of Administrative Procedures Act, April 2, 2003.

IDAPA 58.01.06.001.04, 2003, "Solid Waste Management Facilities Not Regulated Under These Rules," Idaho Department of Administrative Procedures Act, April 2, 2003.

IDAPA 58.01.06.012.06, 2003, "Closure Plan Application," Idaho Department of Administrative Procedures Act, April 2, 2003.

IDAPA 58.01.06.012.11.f, 2003, "Closure Requirements," Idaho Department of Administrative Procedures Act, April 2, 2003.

INEEL, 2000, *Field Sampling Plan for Operable Unit 10-04 Fly Ash Pit and BORAX*, INEEL/EXT-99-01053, Rev. 0, Idaho National Engineering and Environmental Laboratory, May 2000.

SPC-674, 2005, "INTEC Ash Pit Closure," Rev. 0, Idaho Cleanup Project, May 2005.